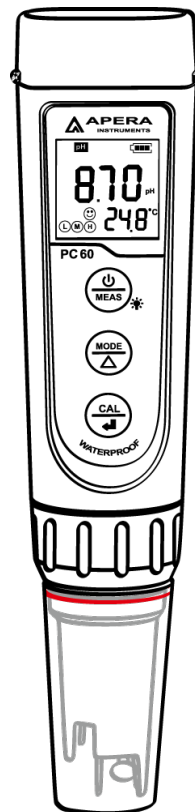


PC60 Premium Multi-Parameter Tester (pH/EC/TDS/Salinity/Temp.)

Instruction Manual



APER A INSTRUMENTS, LLC

www.aperainst.com


Thank you for purchasing Apera Instruments PC60 Premium Multi-Parameter Tester. Please carefully read this instruction manual before using the product in order to have an accurate and reliable test result, and avoid unnecessary damages to the meter or probe.

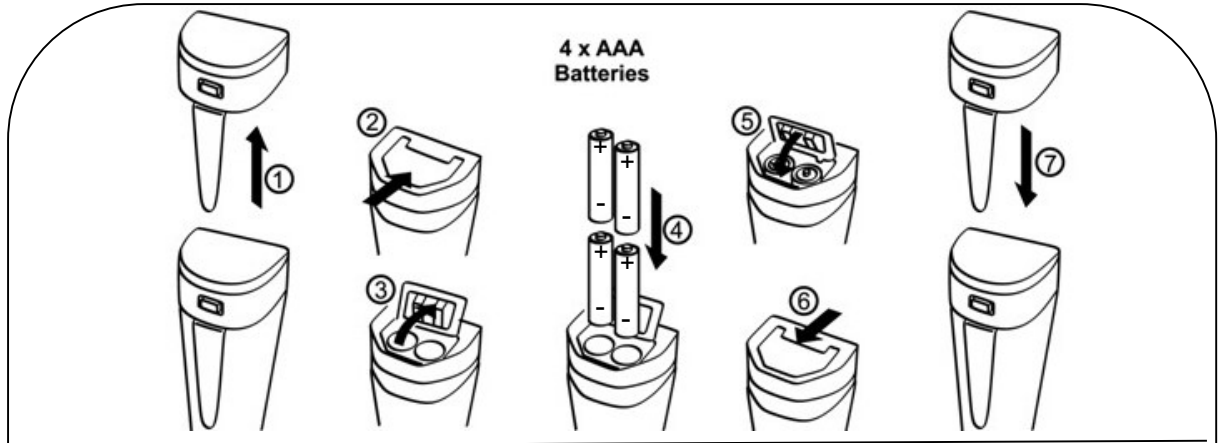
[For video tutorials, please go to support.aperainst.com](http://support.aperainst.com)

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1. Battery Installation

Please install batteries according to the following steps. *Please note direction of batteries: **All POSITIVE SIDES (“+”) FACING UP.** (Wrong installation of batteries will cause damage to the tester and potential hazards) 






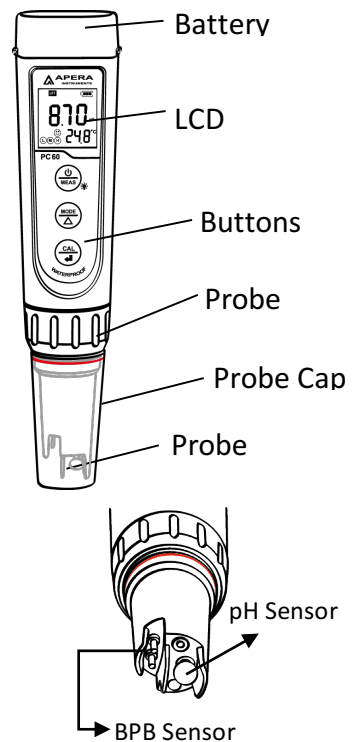
4 x AAA Batteries

- ① Pull the battery cap up
- ② Slide the battery cap along to the direction of arrow
- ③ Open the battery cap
- ④ Insert the batteries (**ALL POSITIVE SIDES FACING UP**) (see graph)
- ⑤ Close the battery cap
- ⑥ Slide and lock the battery cap along to the direction of arrow
- ⑦ Fit the tester's cap while making sure to push all the way down. The tester's waterproof design may be compromised if the cap is not fitted correctly.

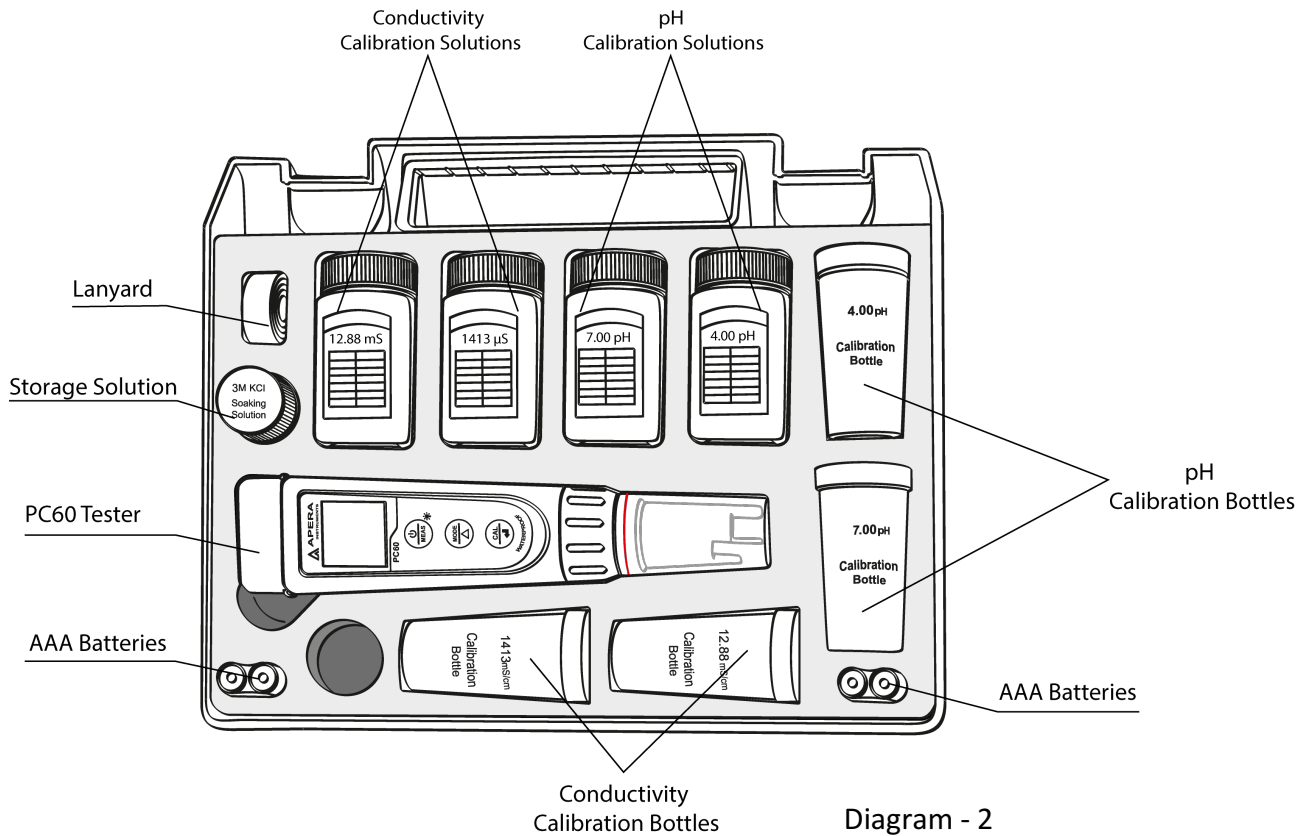
2. Keypad Functions

■ **Short press**----- < 2 seconds ,**Long press**----- > 2 seconds

| | |
|---|--|
|  | <ol style="list-style-type: none"> 1.Short press to turn on the tester and long press to turn off the tester. 2.When turned off, long press to enter parameter setting. 3. In measurement mode, short press to turn on backlight. |
|  | <ol style="list-style-type: none"> 1.In measurement mode, short press to switch parameter pH→COND→TDS→SAL 2.In mode setting, short press to change parameter (Unidirectional) |
|  | <ol style="list-style-type: none"> 1. Long press to enter calibration mode. 2. In calibration mode, short press to confirm calibration. 3.When measured value is locked, short press to unlock; |



3. Complete Kit



4. Preparation Before Use

If it is first-time use or the tester hasn't been used for a long time, pour some 3M KCL solution in the probe cap (about 1/5 of the probe cap) and soak the probe for 15-30 minutes.

When not in use, we recommend store the pH probe in the storage 3M KCL solution in the probe cap to keep the sensor's accuracy. But even if stored dry, it won't do any permanent damage to the sensor. It will only temporarily cause the probe to lose its sensitivity, which can always be restored by soaking in the storage solution.


The storage solution is 3M KCL (potassium chloride). One bottle of 10mL storage solution comes with the tester kit. If the soaking solution was contaminated, please replace with new ones timely.

* **DO NOT** use any other brand's storage solutions because different chemicals may be used and potential permanent damage could be caused to the meter.



5. pH Calibration


Things needed in addition to what's in the box:

A clean cup, distilled water (8-16oz), and tissue papers for rinsing and drying the probe.

5.1 Short press  to turn on the meter; rinse the probe in distilled water, shake the meter in the air and use tissue paper to dap off excess water (**never rub or wipe the sensor**).

5.2 Pour certain amount (about half volume of the calibration bottle) of pH 7.00 and pH 4.00 buffer solution in separate calibration bottles;

5.3 Long press  to enter calibration mode; Short press  to exit.

5.4 Dip the probe in pH7.00 buffer solution, stir gently, and allow it to stand still in the buffer solution until a stable reading is reached. When stable icon  is

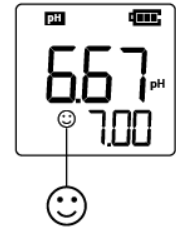












Diagram - 3

displayed on the LCD screen (as shown in Diagram 3), short press  to complete 1-point calibration and the tester returns to measurement mode. Indication Icon  will appear at the bottom left of the LCD screen.

5.5 Rinse the probe in distilled water and dry it. Long press  to enter calibration mode.




Dip the probe in pH 4.00 buffer solution, stir gently, and allow it to stand still in the buffer solution. When stable icon  is displayed on the LCD screen, short press  to complete 2-point calibration and the tester returns to measurement mode. Indication icon   will appear at the bottom left of the LCD screen.






5.6 If necessary, rinse the probe in distilled water and dry it, and dip the probe in 10.01 buffer solution (sold separately) to complete 3rd point of calibration according to the steps in 5.5,

   will appear at the bottom left of the LCD.




■ Notes

- a) Tester will automatically recognize pH buffer solution. Users can perform one-point, two-point, or three-point calibration. **But for the 1st point calibration, only 7.00 pH solution can be used.** Then use other buffer solutions to conduct 2nd or 3rd point calibration. Tester will automatically recognize 5 kinds of pH buffer solutions. Refer to the table below:

| Calibration | USA Series | NIST Series | Calibration Indication Icon | Recommended Accuracy and Range |
|-------------|----------------------------------|--------------------------------------|--|--------------------------------|
| 1-point | 1) 7.00 pH | 1) 6.86 pH |  | Accuracy ≥ 0.1 pH |
| 2-point | 1) 7.00 pH 2) 4.00 or 1.68 pH | 1) 6.86 pH, 2) 4.01 pH or 1.68 pH |   | Measurement Range < 7.00 pH |

| | | | | |
|---------|--|---|--|-------------------------------|
| | 1) 7.00 pH 2) 10.01 or 12.45 pH | 1) 6.86 pH, 2) 9.18 pH or 12.45 pH |   | Measurement Range > 7.00pH |
| 3-point | 1) 7.00 pH 2) 4.00 or 1.68 pH 3) 10.01 or 12.45 pH | 1) 6.86pH 2) 4.01 or 1.68pH, 3) 9.18 pH or 12.45 pH |    | Wide Measurement Range |



- b) For pH Calibration buffer solutions, we recommend that users replace new buffer solution after 10 to 15 times of use to keep the standard buffer's accuracy. Do NOT pour the used calibration solutions back into the solution bottles in case of contamination.
- c) This pH probe will NOT give accurate and stable readings for distilled or deionized water. This is because distilled and deionized water do not have enough ions present for the electrode to function properly. Specialized pH probes need to be used for distilled/deionized water measurement. Contact us at info@aperainst.com for more details.
- d) *When testing purified water like spring water or drinking water, it will take longer for the readings to get stabilized (typically 3-5 minutes) because there is very few ions left to be detected by the sensor in those purified water.*
- e) Do NOT store pH probe in distilled water to prevent permanent damage to the probe.
- f) For the self-diagnosis information, please refer to the table below:

| Symbol | Self-Diagnosis information | Checking and methods to fix |
|-------------|---|---|
| <i>Er 1</i> | Wrong calibration solution or the range of calibration solution exceeds standard. | a) Check if calibration solution is correct (1 st point of pH calibration must be pH 7.00) b) Check if electrode is damaged. c) Check if there is any air bubble in the glass bulb pH sensor |
| <i>Er 2</i> |  Is pushed before measurement is stable ( comes up and stays) | Wait for the smile icon to come up and stay, then press  |


*** If you find any air bubble in the glass bulb of the pH sensor, simply shake the probe for a few times to remove it. The existence of an air bubble in the glass bulb will cause instable measurements.**

*** The 1st point calibration must be 7.00 pH. Perform the 2nd point calibration (4.00 pH) immediately after the 1st point. Do NOT turn off the meter before you conduct 2nd point calibration. If the meter is turned off after 1st point calibration, users will need to restart the calibration process with the 7.00 pH first and the 4.00 pH following after. Calibrating directly in pH 4.00 after turning meter off and back on will cause Er1.**


6.pH Measurement




Short press  to turn on the tester. Rinse the probe in distilled water and dry it. Dip the probe in sample solution, stir gently, and allow it to stand still in the solution. Get readings after  comes up and stays.

7. Conductivity Calibration

7.1 Press  key to switch to conductivity measurement mode. Rinse the probe in distilled water and dry it.

7.2 Pour certain amount (about half volume of the calibration bottle) of 1413 μ S/cm and 12.88 mS/cm conductivity calibration solution into accordant calibration bottles.

7.3 Long press  key to enter calibration mode, short press  to exit.



7.4 Dip the probe in 1413 μ S/cm conductivity calibration solution, stir gently and allow it to stand still in the solution until a stable reading is reached. When stable icon  appears and stays on the LCD screen, short press  key to complete one-point calibration, the tester returns to measurement mode and indication icon  will appear at the bottom left of the LCD screen.

7.5 After calibration, dip the probe in 12.88 mS/cm conductivity calibration solution. If the value is accurate, it is not necessary to conduct 2nd point calibration. If it is inaccurate, follow the steps in 7.3 to 7.4 to complete the 2nd point of calibration using 12.88 mS/cm buffer solution.

* 1000 μ S/cm = 1 mS/cm

8. Conductivity Measurement

Press  key to turn on the tester. Rinse the probe in distilled water and dry it.

Dip the probe in sample solution, stir gently, and allow it to stand still in the solution until a stable reading is reached. Get readings after  comes up and stays. Press  to switch from Conductivity to TDS, and Salinity

■ Notes

- The TDS and Salinity measurements are converted from the conductivity measurements via a certain conversion factor.
- The tester can calibrate 84 μ S, 1413 μ S/cm and 12.88 mS/cm conductivity calibration solution. User can conduct 1 to 3 points calibration. Refer to the table below. Usually calibrating the tester with 1413 μ S/cm conductivity buffer solution alone shall meet the testing requirement.

| Calibration Indication Icon | Calibration Standards | Measuring Range |
|-----------------------------|------------------------------|------------------------------------|
| Ⓛ | 84 $\mu\text{S}/\text{cm}$ | 0 - 200 $\mu\text{S}/\text{cm}$ |
| Ⓜ | 1413 $\mu\text{S}/\text{cm}$ | 200 - 2000 $\mu\text{S}/\text{cm}$ |
| Ⓜ | 12.88 mS/cm | 2 - 20 mS/cm |

c) The tester has been calibrated before leaving the factory. Generally, users can use the tester directly or users can test conductivity buffer solutions first. If the error is large, then calibration is needed.

d) For conductivity calibration solutions, we recommend that users replace new solutions after 5 to 10 times of use to keep the standard solution's accuracy. Do NOT pour the used calibration solutions back into the solution bottles in case of contamination.

e) Temperature compensation factor: The default setting of the temp. compensation factor is 2.0%/°C. User can adjust the factor based on test solution and experimental data in parameter setting P4.




| Solution | Temperature compensation factor | Solution | Temperature compensation factor |
|----------------|---------------------------------|-----------------------|---------------------------------|
| NaCl | 2.12%/°C | 10% Hydrochloric acid | 1.32%/°C |
| 5% NaOH | 1.72%/°C | 5% Sulfuric acid | 0.96%/°C |
| Dilute ammonia | 1.88%/°C | | |

f) 1000 ppm = 1 ppt

g) TDS and conductivity is linear related, and its conversion factor is 0.40-1.00. Adjust the factor in parameter setting P5 based on the requirements in different industries. The factory default setting is 0.71. Salinity and conductivity is linear related, and its conversion factor is 0.5. The tester only needs to be calibrated in Conductivity mode, then after calibration of conductivity, the meter can switch from conductivity to TDS or salinity.

h) **Conversion Example:** if conductivity measurement is 1000 $\mu\text{S}/\text{cm}$, then the default TDS measurement will be 710 ppm (under the default 0.71 conversion factor), and the salinity be 0.5 ppt.

i) For the self-diagnosis information, please refer to the table below:







| Symbol | Self-Diagnosis information | How to fix |
|-------------|---|---|
| <i>Er 1</i> | Wrong conductivity buffer solution, which exceeds the recognizable range of the meter. | 1. Check if buffer solution is correct 2. Check if electrode is damaged. |
| <i>Er 2</i> |  Is pushed before measurement is stable ( comes up and stays) | Wait for the smile icon to come up and then press  |

9. Parameter Setting

9.1 Setting Chart




| Symbol | Parameter Setting Contents | Code | Factory Default |
|--------|---------------------------------|--------------|-----------------|
| P1 | Select pH buffer standards | USA – NIST | USA |
| P2 | Select automatic lock | Off – On | Off |
| P3 | Select backlight | Off - 1 - On | 1 |
| P4 | Temperature compensation factor | 0.00 - 4.00% | 2.00% |
| P5 | TDS factor | 0.40 - 1.00 | 0.71 |
| P6 | Salinity unit | ppt - mg/L | ppt |
| P7 | Select temperature unit | °C - °F | °F |
| P8 | Back to factory default | No – Yes | No |

9.2 Parameter Setting

When turned off, long press  to enter parameter setting → short press 
to switch P1-P2... → P8. Short Press , parameter flashes → short press 
to choose parameter, → short press  to confirm → Long press 
to turn off.


9.3 Parameter Setting Instruction

- a) Select standard pH buffer solution (P1): There are two options of standard buffer solutions: USA series and NIST series. Refer to following chart:

| Icons | | pH Standard Buffer Solution Series | |
|-------------------------|---|------------------------------------|----------------------|
| | | USA series | NIST series |
| Three-point calibration |  | 1.68 pH and 4.00 pH | 1.68 pH and 4.01 pH |
| |  | 7.00 pH | 6.86 pH |
| |  | 10.01 pH and 12.45 pH | 9.18 pH and 12.45 pH |

b) Automatic lock (P2):

Select “On” to activate auto lock function. When reading is stable for more than 10 seconds, the tester will lock the value automatically, and HOLD icon will display on LCD.

Press  key to cancel auto hold.

c) Backlight (P3)

“Off”-turn off backlight, “On”-turn on backlight, 1- backlight will last for 1 minute.

d) Factory default setting(P7)



Select “Yes” to recover instrument calibration to theoretical value (pH value in zero potential is 7.00, slope is 100%), parameter setting return to initial value. This function can be used when instrument does not work well in calibration or measurement. Calibrate and measure again after recover the instrument to factory default status.

10. Technical Specifications

| | | |
|-------|------------------------------------|--|
| pH | Range | -2.00 to 16.00 pH |
| | Resolution | 0.01 pH |
| | Accuracy | ±0.01 pH ±1 digit |
| | Calibration Points | 1 to 3 points |
| | Automatic Temperature Compensation | 0 – 50°C (32 – 122°F) |
| Cond. | Range | 0 to 200.0 µS, 0 to 2000 µS, 0 to 20.00 mS/cm |
| | Resolution | 0.1/1 µS, 0.01 mS/cm |
| | Accuracy | ±1% F.S |
| | Calibration Points | 1 to 3 points |
| TDS | Range | 0.1 ppm to 10.00 ppt |

| | | |
|----------|------------|----------------------|
| | TDS Factor | 0.40 to 1.00 |
| Salinity | Range | 0 to 10.00 ppt |
| Temp. | Range | 0 to 50°C (32-122°F) |
| | Resolution | 0.1°C |
| | Accuracy | ±0.5°C |

11. Icons and Functions

- ① Calibration points indication: **(L)** **(M)** **(H)**
- ② Stable Measurement: 
- ③ Reading value Auto. Lock: **HOLD**
- ④ Self-Diagnostic Information: **Er1**, **Er2**
- ⑤ Low-Voltage warning:  flashes, reminder of battery replacement
- ⑥ Three-Color backlight:
Blue—Measurement Mode; Green—Calibration Mode; Red—Alarm;
- ⑦ Auto. Power off in 8 minutes if no operation.

12. Probe Replacement

Screw off the probe ring, unplug the probe, plug in the new replacement probe (pay attention to the probe's position), and screw on the probe ring. The model numbers of replacement probes that are compatible with PC60 are:

- PC60-E
- PH60-E (Regular pH glass bulb probe)
- PH60S-E (Spear pH probe for solids/semi-solids pH testing)
- PH60F-E (Flat pH probe for surface pH testing)
- EC60-E (Conductivity probe)

13. Warranty

We warrant this instrument to be free from defects in material and workmanship and agree to repair or replace free of charge, at option of APERA INSTRUMENTS, LLC, any malfunctioned or damaged product attributable to responsibility of APERA INSTRUMENTS, LLC for a period of TWO YEARS (SIX MONTHS for the probe) from the delivery.

This limited warranty does not cover any damages due to:

Transportation, storage, improper use, failure to follow the product instructions or to perform any preventive maintenance, modifications, combination or use with any products, materials, processes, systems or other matter not provided or authorized in writing by us, unauthorized repair, normal wear and tear, or external causes such as accidents, abuse, or other actions or events beyond our reasonable control.

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